400W Series Rotorcraft

Instructions for Continued Airworthiness

as installed in

_____

(Make and Model Rotorcraft)

Reg. No._____ S/N_____

STC SR02232LA

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Record of Revision

Rev.	Date	Description of Change
A	10/24/08	Initial Release
B	1/28/09	Added table for list of interfaced equipment, STC number, and changed document title.
C	4/24/09	Added STC number and changed revision levels in section 2.1

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1. INTRODUCTION

1.1 PURPOSE

This document is designed for use by the installing agency of the Garmin Model 400W series GPS/WAAS Nav/Com as Instructions for Continued Airworthiness in response to Federal Aviation regulation (FAR) Part 27.1529, Part 27 Appendix A. The ICA includes information required by the operator to adequately maintain the Garmin Models 400W series installed under Rotorcraft Approved Model List (AML) STC SR02232LA.

1.2 Scope

This document identifies the Instruction for Continued Airworthiness for the modification of the rotorcraft for installation of the Garmin Models 400W series GPS/WAAS Nav/Com installed under Rotorcraft Approved Model List (AML) STC SR02232LA.

1.3 Document Control

This document shall be released, archived, and controlled in accordance with the Garmin document control system. When this document is revised, refer to Section 2.16 for information on how to gain FAA acceptance or approval and how to notify customers of changes.

1.4 Permission to Use Certain Documents

Permission is granted to any corporation or person applying for approval of a Garmin Model 400W series to use and reference appropriate STC documents to accomplish the Instructions for Continued Airworthiness and show compliance with STC engineering data. This permission does not construe suitability of the documents. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.

1.5 Definitions

The following terminology is used within this document:

1) **AC:** Advisory Circular
2) **ACO:** Aircraft Certification Office
3) **AEG:** Aircraft Evaluation Group
4) **CFR:** Code of Federal Regulations
5) **DER:** Designated Engineering Representative
6) **FAA:** Federal Aviation Administration
7) **IAW:** In Accordance With
8) **ICA:** Instructions for Continued Airworthiness
9) **MFD:** Multi-Function Display unit
10) **PMI:** Primary Manufacturing Inspector
11) **POI:** Primary Operations Inspector
12) **STC:** Supplemental Type Certificate
13) **TC:** Type Certification or Type Certificate

14) **TSO:** Technical Standard Order
15) **BIT:** Built In Test
16) **TCDS:** Type Certificate Data Sheet
17) **N/A:** Not Applicable

2. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose and Arrangement:	This document identifies the Instructions for Continued Airworthiness for the modification of the rotorcraft by installation of the Garmin Models 400W Series GPS/WAAS Nav/Com.
Applicability:	Applies to rotorcraft altered by installation of the Garmin Model 400W Series GPS/WAAS Nav/Com.
Definition of Abbreviations:	See Section 1.5
Precautions:	None
Units of measurement:	None
Referenced publications: *(or later FAA approved revisions)*	190-00357-22 Rev. C *STC Rotorcraft Installation Supplement for 400W/500W Series* 190-00356-02 Rev. G *400W Series Installation Manual* 005-C0221-02 Rev. 4 *400W Series Rotorcraft AML STC Installation Master Data List*
Retention:	This document, or the information contained within, will be included in the rotorcraft's permanent records.

2.2 Description of Alteration

The Garmin Model 400W Series GPS/WAAS Nav/Com unit is a 6 ¼ inch wide panel mounted unit with all the interface connections behind the instrument panel. The 400W Series units combine a large number of easily acceptable controls to use the color multi-function display, Nav and Com transceiver, GPS/WAAS navigator in a single unit. The 400W series control and display layout is shown in Figure 1.

Figure 1: 400W Series Control and Display Layout

For a list of equipment interfaced to the 400W Series unit as installed in this installation refer to Table 1 below. For interfaced system installation configuration refer to the GNS 400W Series Post-Installation Checkout Log that is retained as part of the rotorcraft's permanent records.

Table 1: Interfaced Equipment to 400W Series Unit

400W Series Unit Model _____ 400W Series unit P/N _____		
	Manufacturer / Model	**Location**
Main NAV Indicator		
VOR/ILS NAV Indicator		
EHSI		
CDI/HSI Source Selection Annunciator		
Audio Panel		
Encoding Altimeter or Blind Encoder		
Air Data Computer		
Altitude Serializer or Fuel/Air Data		
Weather		
Traffic		
Terrain		
DME		
Autopilot		
IRU/AHRS		
EFIS Display		
Multifuction Display		
400W/500W Series Unit Crossfill		
Other		

2.3 Control, Operating Information

See the 400W Series Installation Manual (P/N 190-00356-02), listed under the reference documentation in paragraph 2.1 of this document, for system operation and self-test information.

2.4 Servicing Information

None. In the event of system failure, troubleshoot the 400W Series unit in accordance with Section 2.6 Troubleshooting Information.

2.5 Periodic Maintenance Instructions

The 400W Series units are designed to detect internal failure. A thorough self-test is executed automatically upon application of power to the units, and built-in test is continuously executed. Detected errors are indicated on the equipment via failure annunciations and maintenance is on-condition.

Operation of the 400W Series unit is not permitted unless an inspection as described in this section has been completed within the preceding 12 calendar months, and after a lightning strike or hard landing. Conduct a visual inspection (look for signs of wear, deterioration, or damage to wires, backshells, or connectors) of the 400W Series unit and wiring harnesses to ensure installation integrity:

1. Inspect the unit for security of attachment.
2. Inspect all knobs and buttons for legibility.
3. Inspect condition of wiring, routing and attachment/clamping.
4. Inspect related antennas for proper sealing and attachment.

2.5.1 Cleaning the Front Panel

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical-cleaning agents. Care should be taken to avoid scratching the surface of the display.

2.5.2 Display Backlight

The display backlight lamp is rated by the manufacturer as having a usable life of 20,000 hours. This life may be more or less than the rated time depending on the operating conditions of the 400W Series unit. Over time, the backlight lamp may dim and the display may not perform as well in direct sunlight conditions. The user must determine by observation when the display brightness is not suitable for its intended use. Contact the Garmin factory repair station when the backlight lamp requires service.

2.5.3 Battery Replacement

The 400W series has an internal keep-alive battery that will last about 10 years. The battery is used for GPS system information. Regular planned replacement is not necessary. The 400W series will display a ‘low battery’ message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

If the battery is not replaced and becomes totally discharged, the 400W Series unit will remain fully operational, but the GPS signal acquisition time may be increased. This acquisition time can be reduced by entering a new seed position each time the unit is powered on. There is no loss of function or accuracy of the 400W Series unit with a dead battery.

The battery must be replaced by the Garmin factory repair station or factory authorized repair station.

2.6 Troubleshooting Information

If error indications are displayed on the 400W Series unit, consult the Troubleshooting section contained in the 400W Series Installation Manual (P/N 190-00356-02), listed under reference documentation in paragraph 2.1 of this document. The '400W Series Post-Installation Checkout Log' in the rotorcraft permanent records includes the configuration information for the installation. (See Section 5 in the 400W Series Installation Manual (P/N 190-00356-02) for a sample Log).

2.7 Removal and Replacement Information

2.7.1 400W Series Unit

If the 400W Series unit is removed and reinstalled, verify that the 400W Series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If the 400W Series unit is removed for repair and reinstalled, or if the 400W unit is removed and replaced with a different 400W Series unit, then follow 'Post Installation Configuration & Checkout Procedures' contained in the 400W Series Installation Manual (P/N 190-00356-02), listed in paragraph 2.1 of this document, and verify the 400W unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If any work has been done on the rotorcraft that could affect the system wiring, antenna cable, or any interconnected equipment, verify the 400W Series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

To remove the 400W Series unit from the mounting rack, insert a 3/32-inch hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool counterclockwise until the unit is forced out about 3/8 inches and can be freely pulled from the rack.

The 400W unit is installed in the rack by sliding it straight in until it stops, about 1 inch short of the final position. Insert the hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

Note: There are no special handling requirements for the 400W Series units.

2.7.2 GA 35 GPS, GA 36 GPS and GA 37 GPS/XM Antennas

For GA 35 or GA 36 antenna removal or replacement, remove the screws from the outside of the rotorcraft. Remove old sealant. Lift the antenna off the rotorcraft and detach the coax (from the outside).

For GA 37 antenna (GPS/XM combination antenna) removal or replacement, remove the screws from the outside of the rotorcraft. Remove old sealant. Lift the antenna off the rotorcraft and detach the coax(s) (from the outside), verifying coax(s) are properly labeled with correct color band. Note: GPS coax is labeled with a blue band and XM cable with a yellow band.

For GA 35, GA 36, or GA 37 GPS antenna installation, follow 'GPS/WAAS Antenna Installation' procedures contained in the STC Rotorcraft Installation Supplement for 400W/500W Series (P/N 190-00357-22), listed in paragraph 2.1 of this document.

2.8 Diagrams

Refer to the 400W Series Installation Manual, P/N 190-00356-02 and STC Rotorcraft Installation Supplement for 400W/500W Series, P/N 190-00357-22 (listed under reference documentation in section 2.1 of this document) for drawings applicable to this installation. Point to point wiring diagrams are in Appendix H of the 400W Series Installation Manual, and Appendix D of the STC Rotorcraft Installation Supplement for 400W/500W Series. Refer to the GNS 400W Series Post-Installation Checkout Log retained in the rotorcraft permanent records for a list of the interfaced equipment. The antenna cables are routed between the 400W Series unit and the antenna with disconnects at each unit. A Rotorcraft wire routing diagram is contained in Appendix A of this document.

2.9 General Procedural Instructions

Weight and balance computation may be required after maintenance of the 400W System installation. Follow the guidelines in the airframe manufacturer's manual. If none are available, use the guidelines established in AC 43.13-1B, Chapter 10, Section 2. Make appropriate entries in the equipment list indicating items added, removed, or relocated along with the date accomplished. Include your name and certificate number in the rotorcraft records. Table 2 identifies the weight of the 400W System equipment. Table 3 lists the location of the 400W System equipment as filled out by the installer.

Table 2: Unit Weight Information

GPS 400W Weight (Installed with rack and back plate)	5.0 lbs. (2.27 kg)
GNC 420W/AW Weight (Installed with rack and back plate)	5.5 lbs. (2.49 kg)
GNS 430W/AW Weight (Installed with rack and back plate)	6.2 lbs. (2.81 kg)
GA 35 Weight	0.47 lbs (0.21 kg)
Garmin P/N 115-00846-10 Doubler Weight (Option used as backing plate for GA 35)	0.09 lbs (0.04 kg)
GA 35 Fabricated backing plate (Installer to Fill in if Applicable)	
GA 36 Weight	0.47 lbs (0.21 kg)
GA 37 Weight	0.50 lbs (0.23 kg)
Garmin P/N 115-00846-00 Doubler Weight (Option used as backing plate for GA 36 or GA 37)	0.17 lbs (0.08 kg)
GA 36 or GA 37 Fabricated backing plate (Installer to Fill in if Applicable)	

Table 3: Unit Location Information

	Part and Model Number	C.G. Station (inches)	Installed Location Description
400W Series Unit			
GPS Antenna			

Procedures and data required for wiring maintenance are described in the 'Cable and Wiring Considerations' section in the 400W Series Installation Manual (P/N 190-00356-02), listed under reference documentation in paragraph 2.1 of this document.

The electrical load analysis may need update after maintenance in accordance with the guidelines in the airframe manufacturer's manual. If none are available, use the guidelines established in AC 43.13-1B, Chapter 11. Use the values in Table 4 for computation:

Table 4: 400W Series Power Input

Input	Connector	Mode	14 VDC		28 VDC	
			Typical	Max	Typical	Max
GPS 400W						
Main power	P4001	--	760mA	1.4A	410mA	700mA
GNC 420W						
Main power	P4001	--	1.12A	2.5A	560mA	1.2A
COM power	P4002	RX	4mA	15mA	8mA	15mA
		TX	3.25A	6.0A	1.6A	3.0A
GNC 420AW						
Main power	P4001	--	1.12A	2.5A	560mA	1.2A
COM power	P4002	RX	N/A	N/A	3mA	15mA
		TX	N/A	N/A	1.6A	3.0A
GNS 430W						
Main power	P4001	--	1.60A	2.5A	800mA	1.2A
COM power	P4002	RX	4mA	15mA	8mA	15mA
		TX	3.25A	6.0A	1.60A	3.0A
GNS 430AW						
Main power	P4001	--	1.60A	2.5A	800mA	1.2A
COM power	P4002	RX	N/A	N/A	3mA	15mA
		TX	N/A	N/A	1.6A	3.0A

Circuits should be protected in accordance with the approved data in this document (see Table 5) and the guidelines in AC 43.13-1B, chapter 11 Section 4. For rotorcraft with multiple power busses, it is recommended that for each 400W Series unit, all power inputs be connected to the same power bus. For power interconnect drawings, refer to 'Appendix H STC Approved Installation Diagrams' in the 400W Series Installation Manual (P/N 190-00356-02), listed under reference documentation in paragraph 2.1 of this document.

Table 5: Circuit Breaker Size and Placard

Unit	Power Input	Placard(s)	14 VDC Breaker Size	28 VDC Breaker Size
GPS 400W (P/N 011-01057-00, -10, -40, -50)	Main (P4001)		5 A	5 A
GNC 420W (P/N 011-01058-00, -10, -40, -50)	Main (P4001)		5 A	5 A
	COM (P4002)		10 A	5 A
GNC 420W (P/N 011-01058-45)	Main (P4001)		N/A	5 A
	COM (P4002)		N/A	5 A
GNC 420AW (P/N 011-01059-00, -10, -40, -50)	Main (P4001)		N/A	5 A
	COM (P4002)		N/A	5 A
GNS 430W (P/N 011-01060-00, -10, -40, -50)	Main (P4001)		5 A	5 A
	COM (P4002)		10 A	5 A
	NAV (P4006)		2 A	2 A
GNS 430W (P/N 011-01060-45)	Main (P4001)		N/A	5 A
	COM (P4002)		N/A	5 A
	NAV (P4006)		N/A	2 A
GNS 430AW (P/N 011-01061-00, -10, -40, -50)	Main (P4001)		N/A	5 A
	COM (P4002)		N/A	5 A
	NAV (P4006)		N/A	2 A

2.10 Special Inspection Requirements

None, N/A.

2.11 Application of Protective Treatments

None, N/A.

2.12 Data Relative to Structural Fasteners

None, N/A.

2.13 Special Tools

No special tools are required for system checkout. See 400W Series Installation Manual listed in reference documentation in section 2.1 of this document.

2.14 Additional Instructions

None

2.15 Overhaul Period

The system does not require overhaul at a specific time period. Power on self-test and continuous BIT will monitor the health of the 400W Series unit. If the unit indicates an internal failure, the unit may be removed and replaced. See troubleshooting section contained in the 400W Series Installation Manual, listed under reference documentation in paragraph 2.1 of this document.

2.16 ICA Revision and Distribution

To revise this ICA, a letter must be submitted to the ACO along with the revised ICA. The ACO will obtain AEG acceptance, and approve any revision to the Airworthiness Limitations Section 3. After FAA acceptance/approval, Garmin will release the revised ICA for customer use, and provide any required notification of the revision.

The latest revision of this document will be available on the Garmin website (www.garmin.com). A Garmin Service Bulletin, describing ICA revision, will be sent to dealers if revision is determined to be significant.

2.17 Assistance

Flight Standards Inspectors or the certificate holder's PMI have the required resources to respond to questions regarding this ICA. In addition, the customer may refer questions regarding this equipment and its installation to the manufacturer, Garmin. Garmin customer assistance may be contacted during normal business hours via telephone 913-397-8200 or email from the Garmin web site at www.garmin.com.

2.18 Implementation and Record Keeping

Modification of a rotorcraft by this Supplemental Type Certificate obligates the rotorcraft operator to include the maintenance information provided by this document in the operator's rotorcraft maintenance manual and/or the operator's rotorcraft scheduled maintenance program.

3. AIRWORTHINESS LIMITATIONS SECTION

There are no additional Airworthiness Limitations as defined in 14 CFR § 27, Appendix A. A27.4 that result from this modification. The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

APPENDIX A

3.1 Wire Routing

The following diagram depicts the wire harness and coax cable routing for the 400W Series unit(s) and antenna(s) throughout the rotorcraft structure: